



U.S. Department
of Transportation

BASELINE STUDY OF ALTERNATIVE IN-LINE INSPECTION VEHICLES

OPS ACCOMPLISHMENTS

Pipeline Safety
Research and
Development for
Enhanced
Operations,
Controls, &
Monitoring

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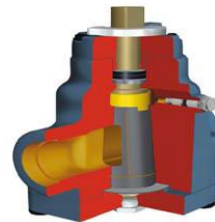
Challenge

The objective of this project is to document the status of unpiggable pipelines and the mitigation options available to make them piggable. This research will also identify and document designs of in-line inspection (ILI) devices which are being used in other industries and which may have application to internal inspections of pipelines.

Technology Description

This research will culminate with presentation of design concepts that have not seen commercial use, which may be candidates for use in ILI. Overall, this study will serve the important role of identifying the options available to the industry and government for dealing with inspection of that large percentage of transmission and distribution pipelines that cannot be internally inspected by smart pigs. It addresses the primary tasks of:

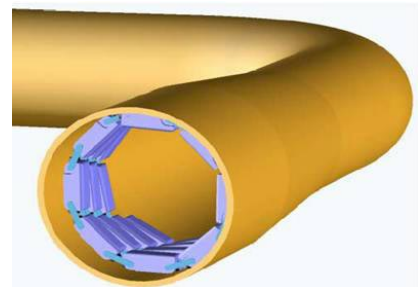
- ◆ Document status of unpiggable pipelines and mitigation options;
- ◆ Document designs of ILI devices being used in other industries;
- ◆ Identify options to inspect transmission and distribution lines;
- ◆ Document current ILI systems in the U.S. and abroad; and
- ◆ Summarize internal tool capabilities in other related industries (nuclear, water, plant production).



Plug valves present an insurmountable obstacle to conventional pigs. The circular pipe cross-section is reduced to a trapezoidal shaped hole with only a fraction of the cross-sectional area afforded by the full pipe diameter.

Accomplishments

During the first phase, data were collected on capabilities of domestic and foreign ILI companies for inspecting pipelines with restrictions. Dialogs were opened with investigators at several US laboratories where innovative new internal inspection concepts are being developed. International web searches revealed new work that could have direct bearing on the problems of transport mechanisms for unpiggable pipelines.



Radical concepts have been proposed for deployment of inspection hardware inside pipes of varying diameters and with non-circular restrictions. This design was developed at the Sandia National Laboratory in Albuquerque.

Office of Pipeline Safety

Research & Special Programs Administration



Innovative new tractor concepts are being produced at laboratories in the USA and abroad. These concepts may lead to a new class of internal inspection devices for pipelines.

Benefits

This project will produce hard data to guide inspection vendors and government agencies that are struggling with the dilemma of unpiggable transmission and distribution lines. The need for ILI of pipelines that are historically unpiggable is well documented. Cost estimates to modify the transmission pipeline system to accommodate conventional smart pigs are in the billions of dollars. Modification of the nation's natural gas distribution system would be equally expensive. Yet, there is still no proven practical alternative to internal inspection for assuring the integrity of a buried pipeline. If a vehicle concept can be developed that will bring modern nondestructive evaluation technology to the interior of today's unpiggable pipelines, the ultimate savings will be enormous.

Future Activities

This project will produce, before the end of fiscal 2003, a report of findings that should provide guidance for future research project funding for development of non-conventional internal inspection concepts. The limits of existing systems will be quantified and the characteristics of alternative approaches described.

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